Progress in Disaster Science 9 (2021) 100143

Contents lists available at ScienceDirect

Progress in Disaster Science

journal homepage: www.elsevier.com/locate/pdisas

Research Article

Children's perceptions of flood risk and preparedness: A study after the May 2018 flooding in Golcuk, Turkey

Ayse Yildiz [a,*], Richard Teeuw [a], Julie Dickinson [b], Jessica Roberts [a]

[a] School of the Environment, Geography and Geosciences, University of Portsmouth, United Kingdom
[b] Department of Organisational Psychology, Birkbeck College University of London, United Kingdom

ARTICLE INFO

Article history:
Received 26 May 2020
Received in revised form 14 December 2020
Accepted 19 January 2021
Available online 23 January 2021

Keywords:
Floods
Children
Risk perception
Preparedness
PRISM
Turkey

ABSTRACT

Understanding children's risk perceptions and investigating the underlying factors are fundamental to learning more about how children interpret and respond to flood events. To date, there has been no published research about the flood risk perceptions of children in Turkey. This research aims to fill that gap, seeking a better understanding of children's flood risk perceptions to inform efforts to strengthen their resilience to flooding. We examined how flood experience shapes Turkish children's perceptions of flood risk and their level of preparedness. Children aged 11 to 14 years were surveyed, in six schools of Golcuk city, Turkey, before and after a local flood event that occurred on 27th May 2018. This research applied a mixed-method approach that collected and analysed both quantitative and qualitative data, using the Pictorial Representation of Illness and Self Measure (PRISM) methodology to measure risk perception and preparedness. The research results show that there was no statistically significant difference in children's flood risk perception before and after the local flood event. However, the importance that children placed on preparedness increased after the flood event. The flood preparedness level of the children surveyed indicates that Turkish children have insufficient knowledge of effective flood preparedness activities: there is an urgent need to make them better prepared for floods. Our findings have implications for policy, especially for those living in flood risk areas. Catastrophic flood events are expected to increase because of climate change, so it is becoming increasingly important to understand the causes of flood risk better, how people perceive flood risk, and how they will respond to flood events. Therefore, flood management policies should incorporate the knowledge, skills, and capacities of children into disaster risk reduction strategies, aiming to reduce the impacts of future flood events.

1. Introduction

Children comprise a large and important proportion of the affected population in an emergency event [1]. According to IFRC [2], of the 250 million people affected by disasters in the past decade, more than half were children, and it is expected that climate change will lead to around 175 million children being affected annually by natural disasters [3]. Furthermore, flood disasters significantly affect children, both physically and psychologically [4]. Despite these figures and the negative effects on children, children's perception, experiences, and needs in disasters are not included in most studies of contemporary flooding [5], even though including the perspective of children is an essential part of disaster community resilience [6]. Anderson [7] argued that disaster research on children is limited because of children's status in society: children do not carry out research, they do not set the research agenda, and children are not involved in policy making.

However, children can have key roles in emergency management, even though emergency plans mostly view children as a vulnerable group [8]. Children can be a great source of change within the community they live in, and they can actively be part of flood risk management, such as involving initiatives for flood preparedness in their communities, schools, and homes [5,9]. Including emergency management and disaster risk reduction information in school teaching programs can be an excellent way to engage with children [8]. Ronan et al. [10] argued that children who participated in hazard education programs in their schools tend to be more prepared, fear less, and perceive risk more realistically than their peers. Several initiatives have targeted children of different age groups for emergency management roles, and children are shown to be important partners with the ability to promote progressive change [8]. In 1999, when Plan International started collaborating with communities to create a “safe village” disaster preparedness model, one study followed a significant flood incident in Vietnam's central provinces. Children participated in group discussion as a part of this activity; and were given the platform to express their knowledge, ideas, and concerns. Through children's engagement, they were made aware of the flooding hazards and vulnerable features in their local area, taught how to protect themselves, their families, and their property; and instructed how to seek help [11].

* Corresponding author at: School of the Environment, Geography and Geoscience, University of Portsmouth, Burnaby Building, Burnaby Road, Portsmouth P01 3QL, United Kingdom.
E-mail address: ayse.yildiz@port.ac.uk (A. Yildiz).

http://dx.doi.org/10.1016/j.pdisas.2021.100143

Over the past decade, flood events have been one of the most widespread and costliest hazards, resulting in considerable losses both of lives and economic costs [12]. From 1990 to 2018, floods globally affected around 3 billion people, caused about USD 750 million of economic losses and more damage to infrastructure than any other type of natural disaster [13]. According to Bouwer et al. [14], catastrophic flood events are expected to increase because of climate change progressively. There is, therefore, an urgent need for disaster risk reduction (DRR) strategies aimed at flood hazards, as well as initiatives that increase flood resilience to cope with floods, from individuals and family level, through to the community and national level.

Flood resilience, which involves improved personal, family, and community preparedness, is central to flood risk management [15,16]. A high level of preparedness improves individual and community resilience and improves response to flood events [17]. Awareness, worry, and preparedness are the specific set of risk characteristics: increasing any factor or combination of these will increase the flood risk perception and, therefore, can contribute to improving flood resilience [18]. However, the relation between preparedness, worry, and awareness is not clear, and some strongly differing results can be found in the literature [19]. For example; Bradford et al. [20] found no correlation between worry or awareness and preparedness level. It has also been found that response to an emergency event depends on how people perceive risk [21]. Therefore, studying flood risk perception can help us understand why levels of resilience are lower in some places than others, as well as identify strategies that will help support communities where they lack capacity. Moreover, studying people's flood risk perceptions can be helpful for understanding public attitudes to current flood risk policies.

1.1. Flood risk perception

Risk studies can be traced back to the pioneering work of Gilbert White [22], which focused on human adjustments to floods in the United States and the influence of previous flood experience on people's behaviour. In the 1960s, Chouncey Starr [23] published research about perceptions of risk, focusing on social benefit versus technological risk. Starr provided an approach to developing a quantitative measure of benefit related to cost for an essential aspect of our social value continuum. In 1978, Fischhoff and Slovic used psychometric methods to assess risk, responding to limitations in Starr's research [24]; with Wang et al., [21] using similar methods to assess flood risk perception.

Risk perception studies have shown that the way people perceive risk depends on different psychological variables, such as people's attitudes, beliefs, feelings, and judgments towards an event [25]. Some research has shown that flood risk perception is directly related to flood risk response behaviours and awareness [26,27]. The effects of flood experience on flood risk perception have been studied [28] and the results indicate that people who experience a flood event tend to change their perception of risk [29]. However, these changes can depend on the context and nature of the flood event [30]. People who experienced a flood event are more likely to see a future flood as a severe risk [31,32] while repeated experiences of flooding have an increased effect on responses to flooding and knowledge about it [33]. Some researchers highlight that flood experience does not merely affect behavioural responses to flood risk, but also influences preparedness activities for flood risk management [34,35]. It is also important to highlight that the “forgetting” curve is logarithmic: the more time that passes post-event, the less risk people tend to perceive [36,37].

1.2. Flooding in Turkey

Turkey has often been affected by damaging flood events, with *approximately* 2 million people affected and some USD 2.1 billion of economic losses between 1948 and 2018 [13]. According to Ozcan [38], 52% of Turkey's flood events happened in coastal areas, i.e., flanking the Marmara Sea, the Mediterranean Sea, and the Black Sea. Since the 1990s, there has been an increase in flood events [39]. Kadioglu [40] argued that these changes could be the results of global greenhouse gas emissions, while Koramaz [41], director of the Union of Chambers of Turkish Engineers and Architects, states that the leading causes of flood disasters in Turkey are unplanned urbanization and inadequate infrastructure.

Although floods have affected both rural and urban areas of Turkey, the impacts of flood events are felt most intensely in Turkey's cities due to the combined effects of heavy rainfall, inadequate drainage systems, the widespread extent of impermeable surfaces, and uncontrolled building and inadequate land-use planning on flood plains [42]. Turkey does not yet have a legal system that includes a general framework of flood risk management, linking land use planning with flood risk management. However, positive steps have been taken for integrated flood risk management by the leadership of Turkey's Disaster and Emergency Management Presidency (AFAD) and General Directorate of State Hydraulics (DSI) [43]. Nevertheless, these mitigation measures might not be sufficient to prevent severe losses from recurring flood events. It has been argued that understanding the human system within Turkish flood management has been neglected because of the general absence of flood research, evidenced by a lack of flood perception studies [42,44]. Globally there is an increasing amount of research focusing on floods and children [5,6,11,45–47]. To date, there have been only a few studies on the flood risk perception of children in Turkey [48,49]. This research seeks to fill that gap to better understand how to strengthen children's resilience to flooding.

1.3. The 27th May 2018 Golcuk local flood event

The study area, Golcuk city, is located on the south coast of the Marmara Sea and occupies an area of ca. 200 km^2 (Fig. 1). The altitude of the study location ranges from 0 m to 1200 m above mean sea level. In the socio-economic development statistics of Turkey, Kocaeli is ranked fourth out of 81 provinces [50]. Golcuk is in the province of Kocaeli, had a population of 162,584 in 2018, with a Dependency Ratio of ca. 47%, that being the proportion of those aged 0–14 and 65 +, relative to those aged 15–64 [51]. The choice of Golcuk as the case study location is deliberate, based on three reasons: (i) Flood incidence: according to the Turkish General Directorate of Meteorology [52], the Marmara region is the wettest in Turkey, and the Kocaeli is the province with the highest precipitation within Marmara region; (ii) In the Golcuk area, no research has previously been performed to investigate the flood risk perception of children or adults; (iii) The lead researcher has long standing detailed geographical knowledge of Golcuk area.

Golcuk has suffered from many local flood events (e.g. 2017, 2016, 2011, 2010) causing economic losses and socio-economic impacts [53], mostly due to the combined effects of heavy rainfall and insufficient urban drainage systems. The Golcuk local flood of May 27th, 2018, damaged 514 houses and 133 workplaces, with 69.8 kg mm/m3 of rainfall. Response teams were deployed to flooded areas from the Kocaeli Provincial Directorate of Disaster and Emergency, Municipality Fire Departments, and the Water Works and Sewerage Administration. On the day of the flood event, the first responders focussed on disruption to the transportation system and evacuation of severely flooded houses and workplaces. Damage Detection Commissions, which were formed by the Kocaeli Governorates and Provincial Environment and Urbanization agencies, inspected flooded houses and workplaces, carried out damage assessments, and issued reports. The Turkish Government provided USD 235,000 of economic support to Golcuk for recovery and reconstruction [53].

2. Methodology

2.1. Rationale

The aim of this research is to investigate children's perception of flood risk and preparedness, as well as examining the actions taken by children during and after the Golcuk flood event of May 27th 2018. In this study, a mixed-methods approach was used. In order to increase the rigour of the research, the collecting and analysing of both qualitative and

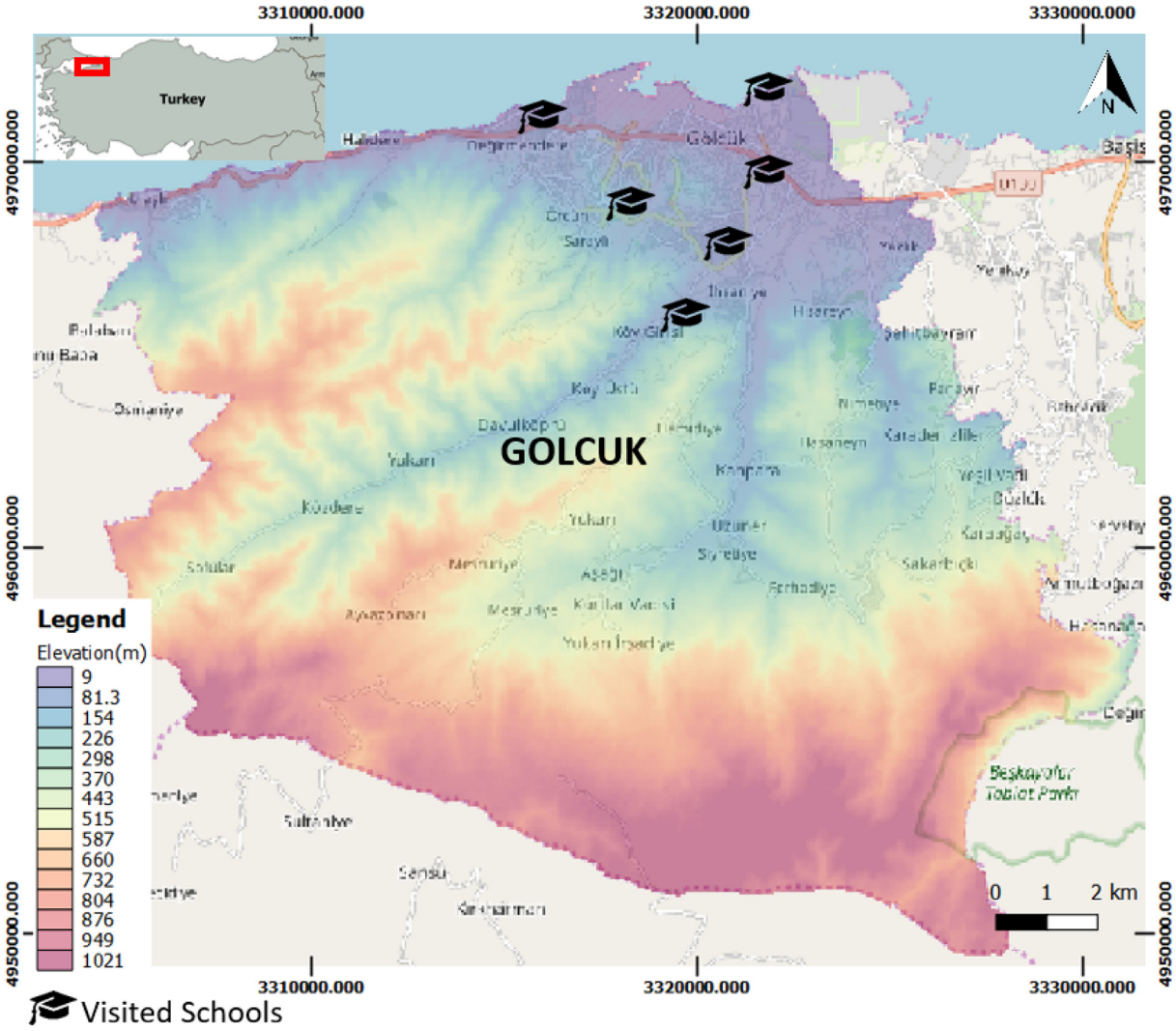

Fig. 1. Topography of Golcuk municipality (created in QGIS using SRTM elevation data overlain on OpenStreetMap; Coordinate system: WGS 84 Pseudo-Mercator).

quantitative data were chosen by linking various perspectives, measures, and validation checks to verify the findings were accurate [54,55]. Also, mixed methods strengths both numerical assessment and participant's in-depth evaluation information and view, consecutively increasing the reliability of the findings, and incorporating multi level insights, helping to understand the research questions completely and complementarity [56]. That was important because we needed to understand better the multiple points of view of children and include results based on children's experiences. Combined with using PRISM, questionnaires, and interviews, the methodology taken allows us to cross-compare data sets obtained [57].

2.2. Sampling

The sampled children were 11–14 years old. To gain a representative sample for children's socio-economic background in Golcuk, the Provincial Ministry of Education recommended 6 schools of the 24 public schools (grades for 5, 6, 7, 8). The managers of sampled schools selected classes for participation in the survey based on class availability. The information letter was sent to children's parents with their children when authorization for a school survey was received, outlining the research and asking their signed consent for their child to participate in the research. The intention of the study was explained to the children before beginning the survey, and then the right of children to participate in the study or not to participate in was clarified (note: three children opted out of the survey). Children were encouraged to ask for clarification if they found it challenging to do anything about the survey.

The data obtained for this research is based on the three-year longitudinal study started in 2018 April by the lead author. The May 2018 Golcuk local flood event occurred between the two sampling dates. The first survey was in April 2018, and the second was conducted six months later, in October 2018. Questionnaire data were obtained from 425 school children. A target population of 425 participants selected according to Krejcie & Morgan [58] guidelines, suggesting that for a size population of more than 1,000,000, a 384 sample size is acceptable. The population of Golcuk is 162,584, according to the Turkish Statistical Institute [51]. In the year 2018, the overall population of children aged 11–14 years (for grades 5, 6) in the 6 chosen schools was: 1740 in Golcuk. Of the 425 participants, 48.7% ($N = 234$) were females, and 51.3% ($N = 191$) were male, which is similar to the data for 2018 12–14 years old, with an average of 48.4% female and 51.5% males in Golcuk [51].

Three or four students were interviewed from each school's participating class following the questionnaires in October 2018. The questions in the interview explored in-depth how children perceive flood risk and the importance of flood preparedness. A total of 58 children from Golcuk, all from the same participating classes involved in the questionnaires, were interviewed. Britten [59] suggests that 50 to 60 interviews are typically required in large qualitative studies.

The majority of the respondents (90.4%, $N = 384$) experienced the May 27th 2018 Golcuk local flooding in their home area. More than half the

participants (53.4%, $N = 227$) encountered the flood water directly, while 36.9% ($N = 157$) experienced it indirectly or did not encounter the flood water at all. This might be because some of the children were located in low-lying flood prone areas, whereas other children were located at higher elevations, away from the flooded areas.

2.3. Survey instruments

In this research, the Pictorial Representation of Illness and Self-Measure (PRISM) is used to measure the perceived effect of hazard in the respondent's current life and their perceived importance of their preparedness. The PRISM was developed by Tom Sensky and Stefan Büchi in 1995 to assess the subjective burden of suffering in patients due to illness [60,61]. PRISM is a basic visual method for aggregating and extracting essential personal information and relies heavily on the description of the subject, object (s), and context [61]. The use of PRISM methods allows participants a greater opportunity to describe themselves, according to Sensky & Büchi [62]. The reliability of the PRISM procedure is high with the reliability of the test-retest $r = 0.95$, $p < .001$ and reliability of the interrater $r = 0.79$, $p < .001$ [60,63]. A modified version of the PRISM to assess the risk perception and preparedness level of the children was used by Yildiz et al., [49]. The PRISM method has shown high validity and reliability. In this research, a "paper and pencil" version of PRISM was used. The children were shown an A4 (210 × 297 mm) sheet of white paper, with a fixed circle in the corner of the paper (Fig. 2). The instructions for the PRISM survey used in this study were [49]:

i. *I would like to understand better how natural hazards (earthquake, flood, landslide, storm, and wildfire) in your local area affect your life at the moment.*
ii. *I would like you to imagine that this white template represents your life as it is now.*
iii. *The circle in the bottom right-hand corner represents your 'self', and the cross (X) represents (mentioned) hazard.*
iv. *Where would you put the (mentioned) hazard to reflect its threats to your life at the moment?*
v. *Where would you like to put (mentioned) hazard to reflect the importance of preparedness for the hazard in your life at the moment?*

The closer the distance to the self-circle that participants put on the PRISM template their response cross (X), the greater their perceived risk and the more important it is for them to be prepared for a specific hazard.

2.3.1. Questionnaire for flood awareness and risk perception

The questionnaire items used in this research was based on the existing literature [9,49,64–66] and a disaster awareness survey of the Turkey's Disaster and Emergency Management Presidency [67]. Using a three-point Likert scale (unlikely, a chance, likely), children were asked the likelihood of occurrence of future flood hazards and the likelihood that those floods would cause injury. The PRISM technique was used to evaluate children's flood risk perceptions.

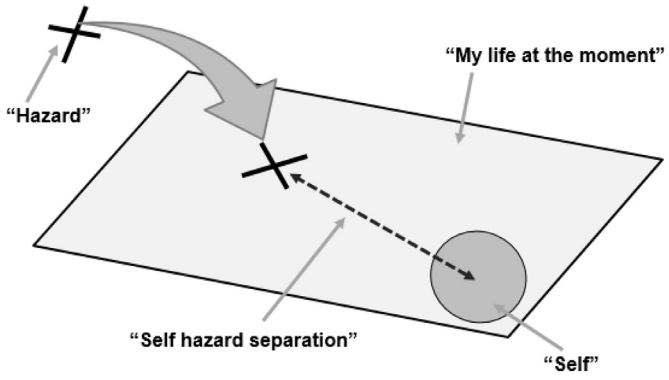

Fig. 2. Pictorial Representation of Illness and Self Measure (PRISM) template [49].

2.3.2. Questionnaire for flood preparedness

(a) *Preparedness knowledge*; participants were asked to identify actions that they felt were appropriate responses for floods, and they were reminded that they could select more than one action that represented an appropriate response for floods. For flood preparedness knowledge, correct actions are: a) Move to an area higher than the flood level, b) Listen to the radio, c) Do not drink tap water, incorrect actions are d) Enter the flood area, e) Go outside and look at the water. The correct answers are promoted nationally by the Turkey's Disaster and Emergency Management Presidency [68], and Finnis et al., [64].
(b) *Physical preparedness*; children were asked a set of questions regarding emergency plans and practices, hazard adjustment actions and preparedness measures. Regarding information on plans and practices, the children were asked via yes/no questions, about the following:
   - having family emergency plans,
   - practising for an emergency at school,
   - practising for an emergency at home,
   - knowing locations of potential emergency exits, assembly areas, location of no/off switches for water or electricity supplies.
   - knowing the locations of where to meet or leave a message in an emergency.
(c) *For preparedness measures and hazard adjustment*; children were asked if they have the following items: a torch, a first aid kit, an emergency kit, a transistor radio with spare batteries, a stockpile of water and food for three days; or carrying out the following task: selecting an emergency contact person living outside the local district. The PRISM technique was used to evaluate children's perceived importance of flood preparedness.

2.3.3. Interview

Separate interviews with the same children were performed following the questionnaires with 58 randomly selected children to examine the reasons behind the children's PRISM responses. It was aimed to select 3 or 4 children from each participating class based on their willingness, availability to give the possible best representative sample of Golcuk schoolchildren. As Taylor and Peace [69] mention: "children are the best authorities on their own lives and more than capable of expressing their views". Talking to children specifically will give us more ideas about how floods impact the life of a child: we can gain insights into their emotions, thoughts, and experiences. That knowledge will help us minimize the impact of flooding, plan better programs for emergency education, raise awareness of floods among children, and motivate children to take active steps. The Turkish-speaking lead researcher performed the children's interviews.

2.4. Pilot study

The pilot study was carried out in Golcuk in randomly chosen school classrooms, with samples of 38 children, in April 2018. The objective of the pilot test was to ensure that the survey questions addressed the research aim and objectives. As in Hassan et al. [70], the pilot study checked whether the questions were relevant, informative, well understood, and well described. The participating children completed all the pilot questions. Children were observed while they were answering the questions: no difficulties were faced during the survey, and they clearly understood all the questions. The assessment of the reliability of the questions was performed using the test-retest methodology: for each value, the paired student test-retest average was not substantially different from each other.

2.5. Data analyses

Using the SPSS Statistics program, the quantitative data was analysed. The Shapiro-Wilk test was applied for the normality of data. The Wilcoxon signed-rank test was used to compare data from before and after the local flood event. The Mann-Whitney *U* test was used to assess the differences in flood risk perception and flood preparedness perception by gender with 95% confidence intervals (CI). The Spearman rho test was used to analyse the correlation between flood risk perception and preparedness

perception. A two-tailed p-value $< .05$ was considered as statistically significant.

In order to interpret interview data, thematic qualitative analysis was chosen [71]. The interviews were recorded and eventually translated for analysis into English. To avoid information loss in the translation process, the transcripts were reviewed and colour coded manually to find key themes in the original text and in the English language text as in Knafl et al., [72].

3. Results

3.1. Hazard awareness and risk perceptions

Children were asked the likelihood of flood hazard occurrence in the future and the likelihood of future flooding causing injury, using a three-point Likert scale. Almost half of the participants rated flooding "unlikely" to happen (46.6%, $N = 198$), even though they had experienced a flood event in the recent past. Furthermore, 64.7% of the children rated as it is "unlikely" that future floods would cause injury ($N = 275$). Table 1 shows the mean, median, and standard deviation of the hazards perceived to be the most likely to affect children for five natural hazards (earthquake, flood, landslide, storm, wildfire) measured by the PRISM method (0–27 cm). The closer the distance to the self-circle that participants placed their response cross on the PRISM template, the higher their perceived risk. Flood hazard (mean = 7.84, median = 6.40) was the second most frequent threatening event, after the earthquake hazard for children.

3.2. Flood preparedness

3.2.1. Importance of preparedness

Table 1 shows the PRISM survey results (overall mean and standard deviation) on the importance of disaster preparedness for five hazards (earthquake, flood, landslide, storm, and wildfire). The closer the distance was to the "self" circle that participants placed their response on the PRISM template, the more important it became for them to be prepared for a given hazard. Mean scores for the importance of preparedness for earthquake (7.59) and flood (7.53) have almost the same scores, however, median scores show that flood hazard was selected as the second most important hazard to be prepared for.

3.2.2. Factual knowledge for preparedness

In terms of factual knowledge of flood preparedness, children were asked to identify the correct actions for flood response. Of the participants, 78.1% ($N = 332$) were aware of the need to move to areas higher than the flood level; 60% ($N = 255$) of those surveyed participants knew the importance of listening to the radio, while 74.8% ($N = 318$) knew to stop drinking tap water. Worryingly, 38.6% ($N = 164$) of the participants thought that "enter the flood area" was a correct response; likewise, 30.6% ($N = 130$) mistakenly thought that, "go outside and look at the water" was a correct response (Table 2).

3.2.3. Physical preparedness

Table 3 shows the information on the preparedness of plans and practices. Of the participating children 65.4% ($N = 278$) did not have a family emergency plan, just below half did not practise emergency drills at school (43.1%, $N = 183$), and the majority did not practice what to do in case of an emergency at home (91.1%, $N = 387$). Of concern are the, 47.8% ($N = 203$) of the children who reported that they do not know the locations of emergency exits, assembly areas, or utility switches (electricity, gas, water supply). Furthermore, almost half of the participants, (48.2%, $N = 205$), reported that they do not know where to meet, or leave a message, in an emergency.

To understand children's preparedness measures and hazard adjustment actions, several questions were asked (Table 4). Results show that more than half of the participating children (69.6%, $N = 296$) had a first aid kit. More than 75.3% ($N = 320$), reported that they have a radio with a spare battery, while 55.8% ($N = 237$) reported they do have a torch, 81.6% ($N = 347$) reported that they have a stockpile of water and food for three days. Also, only 21.6% ($N = 92$) of the participants reported that they had selected an emergency contact person outside of their area.

3.3. Analysis of changes in perception of flood risk and the importance of preparedness

The Shapiro-Wilk test of normality was used to investigate the distribution of the data. The data set was not normally distributed: before flood risk perception ($W = 0.84$, $p < .01$), after flood risk perception ($W = 0.86$, $p < .01$), before flood preparedness perception ($W = 0.86$, $p < .01$), after flood preparedness perception ($W = 0.80$, $p < .01$). As the data was not suitable for a paired sample t-test, a Wilcoxon signed-rank test was used instead. Table 5 shows the means, medians, and standard deviation of children's flood risk perception and importance of flood preparedness before and after the local flood event.

3.3.1. Flood risk perception

Fig. 3 shows the children's changing flood risk perceptions before and after the local flood event. The horizontal line in the centre shows the median of the data. The box covers the interquartile range, and the "whiskers" (extending bar) cover the rest. A Wilcoxon signed-rank test indicated that the median post-test ranks for flood risk perception were statistically not significantly higher than the median pre-test ranks ($z = 41.2$, $p < .262$).

A Mann-Whitney U test indicated that there were no significant differences in flood risk perception by gender before the local flood ($U = 39.5$, $z = -0.94$, $p = .35$, two-tailed), and after the local flood event ($U = 39.4$, $z = -0.99$, $p = .32$, two-tailed).

3.3.2. The importance of flood preparedness

Fig. 4 shows the changing importance of preparedness before and after the local flood. The horizontal line in the centre shows the median of the data. The box covers the interquartile range, and the "whiskers" (extending bar) cover the rest.

A Wilcoxon signed-rank test indicated that the median post-test for the importance of flood preparedness after the local flood event was statistically higher in importance than the median importance of flood preparedness of the participants before the event ($z = 32.9$, $p < .001$). Therefore, the results showed statistically significant differences in the importance of preparedness in Golcuk.

A Mann-Whitney U test indicated that there were no significant differences in importance of flood preparedness by gender before the local

Table 1
Mean, median and standard deviation of the children's risk perceptions and importance of preparedness, for earthquake, flood, landslide, wildfire, and storm hazard.

		Range of scores (cm)	Earthquake	Flood	Landslide	Wildfire	Storm
Risk perception	*N*		425	425	425	425	425
	Mean	0–27	5.16	7.84	9.91	10.10	9.99
	Median	0–27	3.90	6.40	8.70	8.10	8.20
	Std. deviation	0–27	3.42	4.74	5.74	6.11	6.23
Importance of preparedness	Mean	0–27	7.59	7.53	9.08	10.24	9.96
	Median	0–27	4.40	5.60	6.90	9.80	9.00
	Std. deviation	0–27	6.42	5.12	6.01	5.63	6.01

Table 2
Knowledge for flood preparedness: correct actions. (Light grey areas are considered correct responses).

Percentage of children endorsing the following actions:	%	N
Move to an area higher than the flood level	78.1	332
Listen to the radio	60.0	255
Do not drink tap water	74.8	318
Enter the flood area	38.6	164
Go outside and look for water	30.6	130

Table 3
Information on the preparedness of plans and practices.

Percentage of children endorsing the following actions:	%	N
I have a family emergency plan	29.2	124
I have practised what to do in case of an emergency at school	51.8	220
I have practised what to do in case of an emergency at home	8.9	38
I know exits, assembly areas, utility switches	37.4	159
I know where to meet or leave a message in an emergency	40.2	171

Table 4
Preparedness measures and hazard adjustments of children.

Percentage of children endorsing the following actions:	%	N
I have a first aid kit	69.6	296
I have a radio with a spare battery	75.3	320
I have a torch	55.8	237
I have a stockpile of water and food for three days	81.6	347
I picked an emergency contact person outside my area	21.6	92

flood ($U = 20.5, z = -1.4, p = .16$, two-tailed), and after the local flood event ($U = 21.4, z = -0.69, p = .48$, two-tailed).

We tested to examine the correlation between flood risk perception and preparedness perception, using the Spearman rho test, using the non-parametric method as the data was skewed. The Spearman rho test showed a significant positive correlation between the perception of flood risk and preparedness before ($rs = 0.30\ p < .01$) and after ($rs = 0.20, p < .01$) than the local flood event. However, these correlations are quite weak.

3.4. Interview results

Having performed the PRISM survey, 58 randomly selected children were asked to explain why they had placed their cross (X) for "flood hazard" where they had. These comments were recorded; the transcripts were read and colour-coded manually to find key themes, the results of which are provided in Table 6.

Table 5
The means, medians, and standard deviations of children's flood risk perception and importance of flood preparedness.

	Flood risk perception		Importance of preparedness	
	Before	After	Before	After
N	425	425	425	425
Mean	8.5	7.8	9.2	7.5
Median	6.3	6.4	7.2	5.6
Std. Deviation	5.8	4.7	6.2	5.1

The results from the qualitative data collection revealed that children's choices of the location of "flood hazard" on the PRISM survey, was mainly related to education, beliefs, and family in disaster management.

First, education is an integral part of the flood awareness of children. 34 of the 58 participating children's response was linked to education. There are some indicators of the children's flood awareness stemming from their experience of flood. "It happens every year; no one was heavily injured or died, why do I need to worry too much about it" (Ali, male, 13). "Floods cannot be a disaster when I think of my home area, so it does not bother me" (Sevval, female, 13). Another two participants, when discussing their preparation, referred to their school education: "We are not given any information in school to help us be prepared for flood hazards" (Aybuke, female, 13), "if the flood preparation were really important, the school would give us information about it" (Yagmur, female, 12). Another example from one child's response to a preparation question was "what can I do as an individual for preparation; this is the role of the local authorities, my house was heavily affected by the flooding because sewage systems were not working properly" (Emre, male, 14).

Our interview results highlighted the importance of how flood awareness might be improved by disaster education. Teaching children about natural hazards can encourage their participation in disaster phases. Moreover, they can help to disseminate disaster management information to educate and prepare their friends and families, thus increasing community resilience [73].

Second, the findings show that children's cultural and religious beliefs can affect their flood risk perception and their flood preparedness

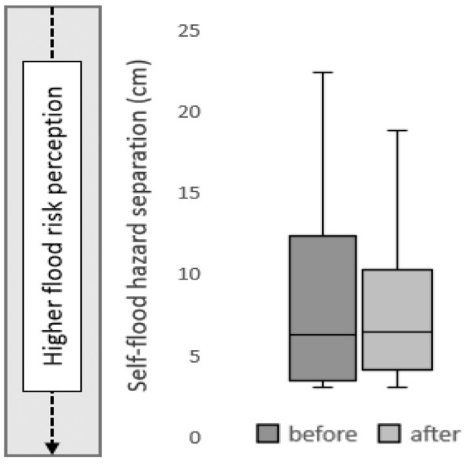

Fig. 3. Self-hazard separation (SHS) of the children's flood risk perception before and after the flood event (median and interquartile range of absolute values in centimeters).

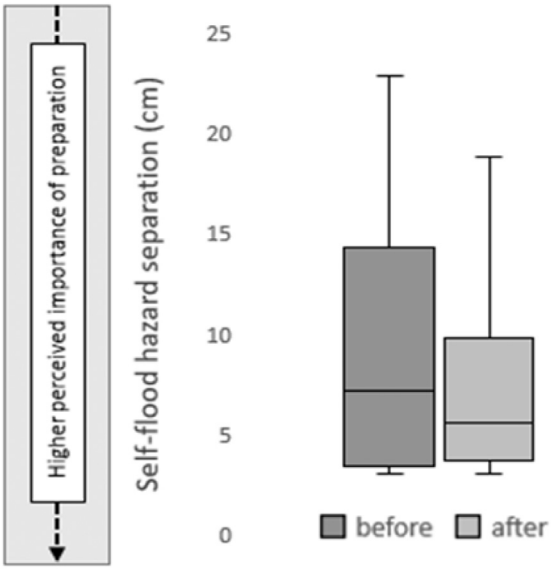

Fig. 4. Self-hazard separation (SHS) of the children's importance of flood preparedness before and after the flood event (median and interquartile range of absolute values in centimeters).

level, as well as apprehension about possible future flood events. For example: “Floods are not popular as earthquakes” (Ceyda, female, 13), “Adults mentioned about earthquakes but I have not heard much about floods” (Ahmet, male, 12). One child's response about flood preparation was an interesting example of belief and prayer: “preparation cannot protect us from disasters, we should just pray to God” (Enes, male, 13).

Third, communication between children and families appears to shape children's perspectives on flood risk and the importance of preparedness. 27 of the 58 participating children's responses pointed to the importance of family in their interview responses. For example, “My dad raises all the important points at home, I never remember that we talked about any of these issues like that before” (Sedef, female, 12).

The findings of the interview were in line with the findings of the quantitative survey. When children were asked about the reason for their choices in the interview, most of the participants' responses were linked to the lack of flood information and flood awareness. Our quantitative results supported this with evidence that almost half of the participating children rated flood events as “unlikely” to happen, even though they had experienced a flood event in the recent past. Also, in the PRISM survey, flood hazard was selected as the second-most threatening event for which it was important to be prepared, after earthquake hazard (Table 1). In the interview, some children mentioned that their learning sources are more based on earthquakes, and they highlighted that they did not know much about the danger of flood hazards, nor how to best prepare for flood events. Moreover, the quantitative results showed that only 8.9% of the participating children practiced what to do in case of an emergency at home (Table 3). In the interview, when children were asked the reason for their choices for flood risk perception and its importance preparedness, some of them highlighted the role of family, with communication between children and their family guiding their choices.

4. Discussion

This research aimed to understand the effects of flood events on Turkish children's flood risk perception and flood preparedness to learn more about how children interpret, prepare, and respond to future flood events.

The surveyed children selected flooding as the second-most threatening hazard after earthquake events (Table 1) and almost half of the children rated flood hazard as unlikely to affect them in the future. This was interesting because the children who participated in this research live in Golcuk, which is one of the cities in Turkey where flood events occur frequently; and all of the children had experienced a flood event directly or indirectly in the recent past. There might be many reasons behind the children's response, but the most likely explanation could be that Turkey's disaster risk reduction activities focus heavily on earthquakes, with relatively little attention given to flood hazards [48]. For example, most disaster education materials are based on earthquakes and do not mention much about flood risk management. This was also mentioned in the interview when children were asked the reason for their choices for flood risk perception and the importance of preparedness. Another explanation could be that the children might link the injury and damage caused by flood events with the occurrence of the flood events. 64.7% of the participated children rated that it is unlikely that future floods would cause injury to them or their family. Also, some participating children pointed out in the interview that they did not need to take flood risk seriously because they had not heard any significant loss from floods.

Table 6
Result of the post-PRISM qualitative research.

Theme	Categories	Sub-categories
Education	Flood awareness	Unsatisfactory knowledge of flood preparedness
	Lack of flood information	Insufficient flood practice
		Inadequate flood information
Beliefs	Risk belief	Strong cultural belief
		Religious belief
Family	Role of family	Communication between children and families about floods

In terms of the changing flood risk perception before and after the local flood event, our results show that there was no statistical difference in children's flood risk perception, before or after the flooding. This was an unexpected finding because one might reasonably expect perceived flood risk to be higher after a recent flood event. A possible explanation could be that children might not have been aware of the consequences of the local flood event they had experienced. During the interview, some of the participating children mentioned that they did not hear much about the damage and loss after the flood in their city. One of them said “I could only see the rising flood water from my window at my home. I do not know anything else about that day. I was safe because we were not on the ground or first floor so there is no reason for me to worry about floods.” There were a few more interviews highlighting the same points. Other researchers have found that people who experienced a flood were more likely to perceive flooding as a serious risk [29,31,32]. However, our findings did not find any relation between flood experience and flood risk perception, as Harvatt et al. [30] mentioned, such perception changes can depend on the context and nature of the flood event. However, it is important to point out that the majority of research into flood risk perception is based on surveys of adult participants and does not examine children's flood risk perception.

In terms of the children's emergency preparedness level, findings showed that children's knowledge for flood preparedness was adequate (Table 2). However, there is still room to improve because more than 38% of the children were not aware of the danger of the entering flood water. Regarding children's preparedness of plans and practices, although the findings show that half of the children reported that they had practised what to do in case of an emergency at school, only a small number (8.9%) reported that they had practiced what to do in case of an emergency at home. The importance of family related issues was also mentioned in the interview: almost half of the children answered that the reason for their choices for flood risk perception and preparedness was related to family discussion on the topic. This highlights the importance of family engagement in disaster risk communication management. Our findings in Table 3 also show that children need more knowledge of emergency exits, assembly areas, and designated meeting points. In terms of the measures and hazard adjustments of children (Table 4), the majority of children's responses were satisfactory, apart from one item: the need for a designated emergency contact person. It is notable that even though most of the children reported that they did not practice emergency drills at home, their disaster preparedness

rate was quite high (Table 4). One of the explanations for this might be; the measurement and adjustment had been done at their home were not only for disaster preparedness, there might be other reasons behind it.

The findings of this research indicate that, with the children's perception of the importance of flood preparedness, there was a significant change, before and after the flood event. This brings to mind the question: why did the children's perception of flood risk not show any significant change, yet the importance of preparedness did? Our interview findings provided some insights to guide our investigation of this question. First of all, flood hazard were not the children's major concern in their lives: most of the children responded that future flood events and related injuries were unlikely. However, children were well aware that, with preparedness initiatives, they could better protect themselves, their families and their home. For example, in the interview one child's response, to explain the importance of preparedness, was "I do not think floods are a real risk for me because it did not give any harm to me or my family. I think preparedness is more important because flood water took a long time to disappear and it affected my daily activity." Our results are in agreement with the findings of White [22], Kates & White [35] and De Man & Simpson-Housley [34], who all found that flood experience could directly affect people's preparedness activities for managing flood risk.

This research also investigated gender factors in flood risk perception and the importance of preparedness. The findings show that there was no statistical difference between the responses of females and males. Although the data presented cannot address the question of why there was no difference between the responses of female and male children to the surveys, the finding is interesting in comparison with previous research. Baytiyeh and Naja [74] found that among the college students in Lebanon no gendered related significance difference was found. However, Babugura [75] suggested that the impact of disasters varies between genders of children, while Cvetković et al., [76] found a gender effect on the level of fear of disasters. Females were found to have a higher risk in comparison to their male peers in their research. Differences in relation to the participants' hydro-geomorphological knowledge, the research instrument used, and the meaning of risk in the context of this study, mean that a comparison between our study and previous studies is not easy. Further research is necessary to understand better the effects of gender on perceptions of flood risk and preparedness.

4.1. Limitations of this study

The findings of this research are from a group of school children in Golcuk: they clearly cannot be generalised to all children in Turkey, let alone all children globally. Furthermore, the PRISM was initially developed as a clinical methodology for the measurement of an illness, not for the understanding of flood risk perception and the importance of flood preparedness. Nevertheless, the children found the PRISM easy to use, and it appeared to be an effective way to measure children's perception of the impact of floods on their lives. Another limitation is the accuracy of the answers from the children surveyed. While the lead researcher encouraged the children to ask any questions where they found difficult to answer, they may have replied to the questions with little consideration or may have copied the answers of a classmate.

5. Conclusion

To date, there has been no published research about the flood risk perceptions of children in Turkey. This research has sought to fill that gap, examining children's perception of flood risk and preparedness. The main findings of this research are that:

(1) Almost half of the participating children rated local flooding as "unlikely" to happen, even though their neighbourhood had experienced a flood event in the recent past; and most of them responded that future local flood events were "unlikely" to cause injury.
(2) There was no statistically significant difference in children's flood risk perception before and after the local flood event. However, the importance that children placed on flood preparedness increased after the local flood event.
(3) Gender was not a significant factor in influencing the children's perception of flood risk and flood preparedness.
(4) Even though children's knowledge for flood preparedness was quite good, there is room for improvement, to make children more flood-aware and better prepared for floods.

5.1. Recommendations

A priority recommendation is to carry out more research into children's flood risk perceptions and their levels of flood preparedness. The frequency of flood events is likely to increase in most countries because of increasing urbanization, along with global heating and associated climate change. Thus, more research is needed, especially via longitudinal studies, to understand better the role of flood events on children's flood risk perception and preparedness levels.

In terms of operational recommendations, both local authorities and government agencies should increase flood awareness activities for schools. For example, flood education should be encouraged in every school, with children informed about flood risks and ways of reducing their risk. Emergency plans should be inserted into the school curriculum; in particular, it is important to ensure that children know the locations of emergency meeting points. Flood awareness education should include: how to prepare; what to do before, during, and after floods; evacuation routes, first aid, and understanding flood risk maps of the local area. Flood simulation events, such as emergency drills, can improve children's learning and improve their coping levels in flood events. To better inform children, teachers should be trained about the hazards, vulnerable features, and risk reduction measures associated with floods and other types of hazards.

Declaration of Competing Interest

None.

Acknowledgments

The authors wish to thank the managers of the participating schools and the children who so kindly participated in the data collection. Approval of this research was gained from the University of Portsmouth Research Ethics Committee on 19 April 2018 with number SFEC 2018-028.

References

[1] Rodriguez-Giralt I, Lopez D, Arenas M. Scoping and review report on evidence of children, young people, disasters and participation; 2016.
[2] IFRC. International Federation of Red Cross and Red Crescent Societies. World disaster report, 2010 – Focus on urban risk. Geneva: Switzerland; 2010.
[3] Dyregrov A, Yule W, Olff M. Children and natural disasters. Eur J Psychotraumatol. 2018;9(Suppl.2):1500823.
[4] Tapsell SM, Penning-Rowsell EC, Tunstall SM, Wilson TL. Vulnerability to flooding: health and social dimensions. Philos Trans R Soc Lond A. 2002;360(1796):1511–25.
[5] Mort M, Walker M, Lloyd Williams A, Bingley A, Howells V. Final project report for 'Children, young people and flooding: recovery and resilience'. Lancaster, UK: Lancaster University; 2016.
[6] Fothergill A, Peek L. Children of Katrina. University of Texas Press; 2015 (ISBN: 978-1-4773-0546-1).
[7] Anderson WA. Bringing children into focus on the social science disaster research agenda. Int J Mass Emerg Disasters. 2005;23(3):159.
[8] Peek L. Children and disasters: understanding vulnerability, developing capacities, and promoting resilience—an introduction. Children Youth Environ. 2008;18(1):1–29.
[9] Bodoque JM, Díez-Herrero A, Amérigo M, García JA, Olcina J. Enhancing flash flood risk perception and awareness of mitigation actions through risk communication: a pre-post survey design. J Hydrol. 2019;568:769–79.
[10] Ronan KR, Crellin K, Johnston DM, Finnis K, Paton D, Becker J. Promoting child and family resilience to disasters: effects, interventions, and prevention effectiveness. Child Youth Environ. 2008;18(1):332–53.
[11] Laufer Ary. Disaster preparedness and safe villages in Central Viet Nam. In: Jabry A, editor. Children and disasters: After the Cameras Have Gone. London: Plan UK; 2002. p. 34–40.

[12] Adikari Y, Yoshitani J. Global trends in water-related disasters: an insight for policymakers. World water assessment programme side publication series, insights. The United Nations, UNESCO: International Centre for Water Hazard and Risk Management (ICHARM); 2009.
[13] EM-DAT: The Emergency Events Database (2019) - Universite catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium.
[14] Bouwer LM, Bubeck P, Aerts JC. Changes in future flood risk due to climate and development in a Dutch polder area. Glob Environ Chang. 2010;20(3):463–71.
[15] Kellens W, Zaalberg R, Neutens T, Vanneuville W, De Maeyer P. An analysis of the public perception of flood risk on the Belgian coast. Risk Anal. 2011;31(7):1055–68.
[16] Morss RE, Mulder KJ, Lazo JK, Demuth JL. How do people perceive, understand, and anticipate responding to flash flood risks and warnings? Results from a public survey in Boulder, Colorado, USA. J Hydrol. 2016;541:649–64.
[17] Paton D, McClure J, Buergelt P. The role of preparedness in natural hazard resilience. Disaster resilience: an integrated approach. Charles C: Thomas Publisher Ltd; 2006. p. 1–43.
[18] Raaijmakers R, Krywkow J, van der Veen A. Flood risk perceptions and spatial multicriteria analysis: an exploratory research for hazard mitigation. Nat Hazards. 2008;46(3):307–22.
[19] Siegrist M, Gutscher H. Natural hazards and motivation for mitigation behavior: people cannot predict the affect evoked by a severe flood. Risk Anal. 2008;28(3):771–8.
[20] Bradford RA, O'Sullivan JJ, Van der Craats IM, Krywkow J, Rotko P, Aaltonen J, et al. Risk perception—issues for flood management in Europe. Nat Hazards Earth Syst Sci. 2012;12(7).
[21] Wang Z, Wang H, Huang J, Kang J, Han D. Analysis of the public flood risk perception in a flood-prone city: the case of Jingdezhen City in China. Water. 2018;10(1):1577.
[22] White GF. Human adjustment to floods: a geographical approach to the flood problem in the United States (no. 29). The University of Chicago; 1945.
[23] Starr C. Social benefit versus technological risk. Science. 1969:1232–8.
[24] Fischhoff B, Slovic P, Lichtenstein S, Read S, Combs B. How safe is safe enough? A psychometric study of attitudes toward technological risks and benefits. Policy Sci. 1978;9(2):127–52.
[25] Figueiredo E, Valente S, Coelho C, Pinho L. Coping with risk: analysis on the importance of integrating social perceptions on flood risk into management mechanisms–the case of the municipality of Agueda, Portugal. J Risk Res. 2009;12(5):581–602.
[26] Grothmann T, Reusswig F. People at risk of flooding: why some residents take precautionary action while others do not. Nat Hazards. 2006;38(1–2):101–20.
[27] Ho MC, Shaw D, Lin S, Chiu YC. How do disaster characteristics influence risk perception? Risk Anal. 2008;28(3):635–43. https://doi.org/10.1080/20008198.2018.15000823.
[28] Lawrence J, Quade D, Becker J. Integrating the effects of flood experience on risk perception with responses to changing climate risk. Nat Hazards. 2014;74(3):1773–94.
[29] Botzen WJW, Aerts JCJH, van den Bergh JCJM. Dependence of flood risk perceptions on socioeconomic and objective risk factors. Water Resour Res. 2009;45(10).
[30] Harvatt J, Petts J, Chilvers J. Understanding householder responses to natural hazards: flooding and sea level rise comparisons. J Risk Res. 2011;14(1):63–83.
[31] Laska SB. Homeowner adaptation to flooding: an application of the general hazards coping theory. Environ Behav. 1990;22(3):320–57.
[32] Payne RJ, Pigram JJ. Changing evaluations of flood plain hazard: the Hunter River valley, Australia. Environ Behav. 1981;13(4):461–80.
[33] Hansson RO, Noulles D, Bellovich SJ. Knowledge, warning, and stress: a study of comparative roles in an urban floodplain. Environ Behav. 1982;14(2):171–85.
[34] De Man A, Simpson-Housley P. Correlates of responses to two potential hazards. J Soc Psychol. 1988;128(3):385–91.
[35] Kates RW, White GF. The environment as hazard. New York: Oxford University Press; 1978.
[36] Eysenck MW, Keane MT. Cognitive psychology: A student's handbook. 7th ed.. Hove, UK: Psychology Press; 2015.
[37] Fanta V, Šálek M, Sklenicka P. How long do floods throughout the millennium remain in the collective memory? Nat Commun. 2019;10(1):1105.
[38] Ozcan E. Sel olayı ve Türkiye. Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi. 2006;26(1).
[39] Komuscu AU, Ceylan A. Determining flood risk areas in Turkey based on the severe rainfall data. Ankara, Turkey: V. National Hydrology Congress Proceedings; 2007 [in Turkish].
[40] Kadıoğlu M. Bildiğiniz Havaların Sonu. Güncel: Küresel İklim Değişikliği ve Türkiye; 2001.
[41] Koramaz E. Yaşanan Seller Doğal Afet Değildir! Retrieved 16 July 2019, from https://www.tmmob.org.tr/icerik/yasanan-seller-dogal-afet-degildir-carpik-kentlesme-ve-yetersiz-altyapi-sellere-neden; 2017.
[42] Kömüşcü AÜ, Çelik S. Analysis of the Marmara flood in Turkey, 7–10 September 2009: an assessment from hydrometeorological perspective. Nat Hazards. 2013;66(2):781–808.
[43] Çetin N, Tezer A. ABD, Avrupa Birliği ve Türkiye'de sel risk yönetiminin karşılaştırılması. Presentation, 3. Istanbul: Ulusal Taşkın Sempozyumu; 2013.
[44] European Environment Agency. Sustainable water use in Europe, part 3: extreme hydrological events: floods and droughts environmental issue Report No. 21 Copenhagen. https://www.eea.europa.eu/publications/Environmental_Issues_No_21; 2001.
[45] Bosschaart A, Kuiper W, van der Schee J, Schoonenboom J. The role of knowledge in students' flood-risk perception. Nat Hazards. 2013;69(3):1661–80.
[46] Mort M, Walker M, Williams AL, Bingley A. Displacement: critical insights from flood-affected children. Health Place. 2018;52:148–54.
[47] Young People''s Flood Manifesto. Received from http://wp.lancs.ac.uk/cyp-floodrecovery/files/2016/05/Young-Peoples-Flood-Manifesto-FINAL.pdf; 2015. (Accessed 10 December 2020).
[48] Kara İ, Özdemir N. Hazard perception and disaster information of turkish secondary school students. J Educ Black Sea Region. 2020;6(1). https://doi.org/10.31578/jebs.v6i1.220.
[49] Yildiz A, Teeuw R, Dickinson J, Roberts J. Children's earthquake preparedness and risk perception: a comparative study of two cities in Turkey, using a modified PRISM approach. Int J Disast Risk Reduct. 2020;49:101666. https://doi.org/10.1016/j.ijdrr.2020.101666.
[50] SEGE. Kalkınma Bakanlığı İllerin ve Bölgelerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması. Ankara: Bölgesel Gelişme ve Yapısal Uyum Genel Müdürlüğü; 2011.
[51] Turkish Statistical Institute. Available from: http://www.turkstat.gov.tr/PreTablo.do?alt_id=1047; 2019.
[52] MGM. T.C. Tarim ve orman Mudurlugu Meteroloji Genel Mudurlugu. 2017-2018 Su/Tarim Yili Alnsal Yagis Degerlendirmesi; 2018 [Ankara].
[53] Kocaeli AFAD. Sel Afetinden Kaynakli Mağduriyetler Gideriliyor - Haberler - KOCAELİ İl Afet ve Acil Durum Müdürlüğü. Available from: https://kocaeli.afad.gov.tr/tr/28474/sel-afetinden-kaynakli-magduriyetler-gideriliyor; 2019.
[54] Creswell JW, Clark VLP. Designing and conducting mixed methods research. Sage Publications; 2017.
[55] Perlesz A, Lindsay J. Methodological triangulation in researching families: making sense of dissonant data. Int J Soc Res Methodol. 2003;6(1):25–40.
[56] Stentz JE, Clark VLP, Matkin GS. Applying mixed methods to leadership research: a review of current practices. Leadership Q. 2012;23(6):1173–83.
[57] Bryman A. Social research methods. 4th ed.. UK: Oxford University Press; 2012.
[58] Krejcie RV, Morgan DW. Determining sample size for research activities. Educ Psychol Meas. 1970;30(3):607–10.
[59] Britten N. Qualitative research: qualitative interviews in medical research. Bmj. 1995;311(6999):251–3.
[60] Büchi S, Buddeberg C, Klaghofer R, Russi EW, Brändli O, Schlösser C, et al. Preliminary validation of PRISM (pictorial representation of illness and self measure)–a brief method to assess suffering. Psychother Psychosom. 2002;71(6):333–41.
[61] Büchi S, Sensky T, Sharpe L, Timberlake N. Graphic representation of illness: a novel method of measuring patients' perceptions of the impact of illness. Psychother Psychosom. 1998;67(4–5):222–5.
[62] Sensky T, Büchi S. PRISM, a novel visual metaphor measuring personally salient appraisals, attitudes and decision-making: qualitative evidence synthesis. PloS One. 2016;11(5):e0156284.
[63] Büchi S, Sensky T. PRISM: pictorial representation of illness and self measure: a brief nonverbal measure of illness impact and therapeutic aid in psychosomatic medicine. Psychosomatics. 1999;40(4):314–20.
[64] Finnis KK, Johnston DM, Ronan KR, White JD. Hazard perceptions and preparedness of Taranaki youth. Disaster Prevent Manag. 2010;19(2):175–84.
[65] Finnis K, Standring S, Johnston D, Ronan K. Children's understanding of natural hazards in Christchurch, New Zealand. Austr J Emerg Manag. 2004;19(2):11.
[66] Miceli R, Sotgiu I, Settanni M. Disaster preparedness and perception of flood risk: a study in an alpine valley in Italy. J Environ Psychol. 2008;28(2):164–73.
[67] Bursa AFAD. Bireyler ve aileler icin afet bilinci egitimi, Egitim Bilgi Formu. Ankara: Form A. Disaster awareness survey of the Turkish Disaster and Emergency Management Presidency; 2019 (in Turkish).
[68] AFAD. The disaster and emergency management presidency of Turkey. Ankara: Schools Disaster Awareness and Education Project; 2013.
[69] Taylor H, Peace R. Children and cultural influences in a natural disaster: flood response in Surakarta, Indonesia. Int J Disast Risk Reduct. 2015;13:76–84.
[70] Hassan ZA, Schattner P, Mazza D. Doing a pilot study: why is it essential? Malays Family Phys. 2006;1(2–3):70.
[71] Wester FPJ. In: Krippendorff K, editor. Content analysis. An introduction to its methodology, 2005. ; 2005 (9780761915447).
[72] Knafl KA, Webster DC, Benoliel JQ, Morse JM. Managing and analyzing qualitative data: a description of tasks, techniques, and materials. West J Nurs Res. 1988;10(2):195–218.
[73] Pfefferbaum B, Pfefferbaum RL, Van Horn RL. Involving children in disaster risk reduction: the importance of participation. Eur J Psychotraumatol. 2018;9(sup2):1425577.
[74] Baytiyeh H, Naja MK. Are colleges in Lebanon preparing students for future earthquake disasters? Int J Disast Risk Reduct. 2015;14:519–26.
[75] Babugura AA. Vulnerability of children and youth in drought disasters: a case study of Botswana. Child Youth Environ. 2008;18(1):126–57.
[76] Cvetković VM, Öcal A, Ivanov A. Young adults' fear of disasters: a case study of residents from Turkey, Serbia and Macedonia. Int J Disast Risk Reduct. 2019;35:101095.